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**Productivity of the English National
Health Service from 2004/5:
Updated to 2011/12**

CHE Research Paper 94

Productivity of the English National Health Service From 2004/5: updated to 2011/12

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1. Introduction

We measure the productivity of the health care sector over time by comparing the total amount of health care ‘output’ produced to the total amount of ‘input’ used to produce this output in accordance with Eurostat conventions (Eurostat, 2001). To construct a time series, we need to account for changes in routine data collection procedures, such as data coverage and changing activity definitions. To do this we construct a series of chained indices for both output and input growth in consecutive years. This allows us to calculate a like-with-like productivity growth series for the English National Health Service for the time period from 2004/5 to 2011/12.

Output consists of the volume of all health care services provided to NHS patients and also accounts for quality improvements.

- The volume of NHS outputs across all health care sectors is captured as comprehensively as possible, using the Hospital Episode Statistics and Reference Cost database and other data sources;
- The quality of NHS outputs is captured by inpatient and outpatient waiting times, 30-day survival rates, and improved blood pressure control in primary care.

Inputs include staff, intermediate goods and services, and capital resources that contribute to the production of health care.

- The volume of NHS labour is measured using data from the Electronic staff record (ESR);
- The volume of prescriptions is measured using data by chemical composition from the Prescription Pricing Authority;
- The volume of all other inputs are derived from expenditure data compiled from NHS organisational accounts;
- The output and input indices are consistent in how they account for services procured from non-NHS bodies.

We explore alternative ways of populating the input index, which vary according to the data source used.

We report productivity growth over the period 2004/5 to 2011/12, focussing on the issues involved in calculating the most recent set of figures. We find that productivity growth in 2010/11 – 2011/12 was around 2.13% to 2.38% depending on the choice of mixed or indirect input index used. Over the whole time series we find that quality adjusted output has increased by 40%. Inputs have increased by 28% using the mixed input measure and by 26% using the indirect measure, leading to a total factor productivity growth over the entire period of 10% and 11% respectively.

In the next section we describe our data sources. The output index is populated in section 3. Section 4 reports the elements of the input index. Section 5 summarises the productivity growth figures. Concluding remarks are provided in Section 6.

2. Methods and data

Total factor productivity growth is calculated by dividing an index of output growth by an index of input growth:

$$\Delta TFP = [I/Z] - 1 \quad (1)$$

Where ΔTFP is total factor productivity growth, I is the index of output growth and Z is the index of input growth. In order to estimate total factor productivity, it is therefore necessary to correctly define and measure the output and input indices.

2.1 Measuring output

Our NHS output index captures all activities provided to NHS patients by either NHS organisations or independent sector organisations. Table 1 below summarises data sources used for both activity and unit costs.

Table 1 Summary of output data sources

Output type	Activity source	Cost source	Quality	Notes for 2011/12 data
Elective	HES	RC	30-day survival; Health outcomes; Waiting times	
Non-elective	HES	RC	30-day survival; health outcomes	
Mental health	HES & RC	RC	30-day survival; Health outcomes; Waiting times	Major overhaul of MH categories in RC
Outpatient	RC	RC	Waiting times	
Community care	RC	RC	N/A	
A&E	RC	RC	N/A	Paramedic services were completely dropped from RC collection. Instead, Ambulance services were reported as a new category.
Other (1)	RC	RC	N/A	Major overhaul of Cystic fibrosis categories
Primary care	Pre-2009/10 from QResearch Post-2009/10 from GP patient survey	PSSRU Unit Costs of Health and Social Care	QOF data	
Prescribing	Prescription cost analysis system	Prescription cost analysis system	N/A	
Ophthalmic and dental services	IC	IC	N/A	
Glossary	HES: Hospital Episode Statistics; RC: Reference Costs; MH: Mental Health; PSSRU: Personal & Social Services Research Unit; QOF: Quality and Outcomes Framework; IC: Health and Social Care Information Centre; DH: Department of Health			
Note	(1) Radiotherapy & High Cost Drugs, Diagnostic Tests, Hospital/patient Transport Scheme, Radiology, Rehabilitation, Renal Dialysis, Specialist Services			

Hospital Episode Statistics

The Hospital Episode Statistics (HES) is the source of data for both the amount of activity and for the measures of quality for elective, non-elective and mental health care delivered in hospitals.¹ HES comprise over 18.8 million patient records for 2011/12. We convert HES records into Continuous Inpatient Spells (CIPS) and then count the number of CIPS in each Healthcare Resource Group (HRG), which form the basic means of describing different types of hospital output. The cost of each CIPS is calculated on the basis of the most expensive FCE within the CIPS, with costs for each HRG derived from the Reference Cost data. We then calculate the national average cost per CIPS in each HRG. We use the official algorithm for calculating CIPS published by the NHS Information Centre² for HES inpatient activity from 2010/11 onwards. The HES records include waiting times and can be linked to ONS death registry records. This allows us to calculate waiting times and 30-day survival rates which are used to assess the quality of hospital care.

Reference cost data for 2011/12

The Reference Cost returns (RC) are used to capture activity performed in all NHS settings, other than hospitals and primary care. They also provide information on unit costs for these activities, including activity performed in hospitals. In particular, RC data cover activity conducted in outpatient and accident and emergency departments, mental health and community care settings, and diagnostic facilities. Activity data is reported in various ways: attendances, bed days, contacts and number of tests. In order to aggregate activity as diverse as these and convert them into a common metric, we use unit costs as weights.

RC data are always subject to some degree of change over time. Relative to 2010/11, the 2011/12 data have been subjected to three major changes. They are:

1. The lack of data from Primary Care Trusts (PCTs) and Personal Medical Services (PMS)
2. The almost total reclassification of Mental Health activity and cystic fibrosis
3. Changes to classification of some Accident & Emergency activity

Data from PCTs and PMS

Following recent reorganisations in the NHS, Primary Care Trusts (PCTs) no longer exist. As a consequence of the expected phasing out of PCTs, the 2011/12 RC data cover activity provided by NHS trusts (both Foundation and non-Foundation) only, including activity sub-contracted out to independent sector organisations³. This is problematic as PCTs were still actively engaged in providing NHS activity during this year albeit on a reduced scale. This leads to the likelihood of an unknown amount of unrecorded PCT activity.

It would appear that most of the activity previously conducted by PCTs and Personal Medical Services (PMS) is now captured in the returns made by NHS Trusts and NHS Foundation Trusts, either directly or by sub-contracting it out, a process that started in 2010/11. Annex B of the 'Reference costs 2011-12' document reports key figures regarding the total amount of costs submitted by type of providers from 2006/7 to 2011/12, with total trends suggesting that a shift of the majority of activity from PCTs and PMS to NHS Trusts and non-NHS providers has indeed

¹ As in previous years, we exclude patients categorised to HRG SB97Z (same day chemotherapy admission/attendance) because this is excluded from the hospital Reference Cost collection and is intended to attract a zero tariff under Payment by Results.

² <http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1072>

³ In this case unit costs submitted are 'in effect the price paid by the NHS for the service and *not* the cost to independent sector organisations (Reference costs 2011-12, p. 11 (2012))' (emphasis added).

occurred⁴. However, with all the changes that take place over time, it is very difficult to state the percentage of activity previously carried out by PCTs and PMS that has been absorbed by NHS Trusts and Foundation Trusts from the RC data alone. An example is given by following the recorded activity for currency code CN301AF (District Nursing Services: Adult: Face to Face) over time.

Table 2: CN301AF activity over provider type over time

Provider Type	2007/8	2008/9	2009/10	2010/11	2011/12
PCT	27,949,866	27,041,388	27,341,457	22,936,486	.
Trust	338,933	395,854	480,577	5,804,543	24,159,757
Non-NHS	0	186,453	159,049	0	404,472
PMS	35,268	47,948	38,783	18,225	.
Total	28,324,067	27,671,643	28,019,866	28,759,254	24,564,229

Table 2 shows that prior to 2011/12, the total amount of activity across all provider types was quite stable with a slight upward trend. However, in 2010/11 there is a very clear shift of activity from PCTs to Trusts. This shift seems to have increased in 2011/12. However, it is not clear that all of the PCT activity has been transferred to Trusts and it remains possible that there is some PCT activity still taking place that is not recorded. In 2011/12 there are approximately 4 million fewer contacts than average over the previous years. This may be because some of the activity that would have occurred in PCTs is genuinely no longer taking place or, alternatively, it may be that there are still around 4 million PCT contacts that have simply not been recorded – it is not possible to tell from these data alone.

Further inspection of the other large changes in activity between 2010/11 and 2011/12 suggest that some services have also been subject to large shifts between PCTs and Trusts, and thus may have also been subject to missed reported activity. The main areas are:

- Community Care (in which CN301AF resides);
- Rehabilitation; and
- to some extent Chemo/Radiotherapy & High Cost Drugs (mainly through high cost drugs).

Overall both Community Care and Rehabilitation have shrunk by approximately 10%, a figure which seems unlikely to be genuinely true and more likely an artefact of omitted PCT activity. Conversely, Chemo/Radiotherapy & High Cost Drugs has grown by 17%. This may seem too high to be a true reflection of growth, but it may be partly due to unit costs in Trusts being higher than unit costs in PCTs for high cost drugs. Note also that this sector has always been prone to large annual growth rates in activity. Indeed year-on-year growth of 17% is only 1% higher than the lowest growth rate recorded over the period 2007/8 to 2011/12.

To add to this difficulty is the fact that re-categorisations/classifications of activity and the introduction of new currencies have taken place simultaneously in the 2011/12 RC data collection. The new currencies have been introduced to *'support the expansion of Payment by Results currencies and tariffs'* (1) (pp. 45-46).

⁴ In order to validate whether the shift of activity has indeed occurred, we have compared total volumes and trends of activity by setting (e.g. outpatient, community care) and across provider type, with total volumes of activity showing consistency over time.

Mental health care

There has been a major overhaul of the way in which mental health care activity is defined in the RC data collection with the introduction of new mental health clusters. These *'reflect patient need over specific periods of time that range from four weeks to 12 months, and apply to both admitted patient and community care. The care clusters cover working age adults and older people only, and replace previous reference cost currencies for adult and elderly mental health services. They also include some services previously reported as specialist mental health services or mental health specialist teams. Existing reference cost currencies for children and adolescent, drug and alcohol, and some specialist mental health services remain, but we have refined these in light of the introduction of the care clusters.'* (1, p. 45).

If the introduction of clusters were simply a reclassification of activity that was recorded in previous time periods, then there would not be any conceptual problem with including the new classifications in our measure of output. This is true even if the granulation of measurement has changed so long as RC records the same activity in greater definition. For example, if a fairly aggregated unit of activity is now recorded as separate smaller distinct activities, then if the unit cost associated with that activity is also allocated across the new activities such that the old cost is broadly speaking the sum of the new parts, then the process of cost-weighting allows meaningful comparison over time. The only limitation in this case is that the costs of the 'new' activities in the previous time period need to be imputed from current prices (2).

To some extent, this type of reclassification appears to have taken place. However, we also find that there has been a substantial increase in the volume of activity combined with a substantial decrease in the average unit cost of that activity. Hence, calculations of Laspeyres and Paasche volume indices for Mental Health care activity indicate an increase of cost-weighted activity of approximately 55%. Thus, our conclusions are that the reclassification not only has a finer, more disaggregated and refined definition of previously recorded activity, but that the new reclassification also records some activity for the first time. As we are unable to isolate newly recorded activity from redefined but previously recorded activity, our chosen course of action is to omit RC Mental Health activity from the productivity calculation for 2010/11-2011/12.

Cystic fibrosis

The way that care for those with cystic fibrosis is described has also changed. Prior to 2011/12 there were ten currencies based on cystic fibrosis bands and an adult/child distinction. In 2011/12 this switched to 30 currency codes still based on band splits and adult/child splits but now also on specialist/shared providers. *'Under the new currency model, each patient is allocated to one of seven bands derived from clinical information including cystic fibrosis complications and drug requirements, each of which describes an increasingly complex year of care.'* (1, p. 45).

This revision may indicate a more granular definition of previously recorded activity and in principle should be amenable to being incorporated in our methods for calculating productivity. However, the currency in which cystic fibrosis activity is reported has changed from 'activity' to 'patient' and as a result the cost-weighted activity has risen from approximately £50 million to £84 million, with an associated increase in the Laspeyres output index of 58%. Again, such a large increase coupled with the fact that this area has been subject to reclassification would strongly suggest that this increase is partly an artefact of the reclassification and not a genuine increase in activity. Our estimates of productivity growth therefore omit the cystic fibrosis activity from the calculation.

Accident & emergency

For Accident & Emergency services, paramedic activity has been discontinued and replaced with a new set of ambulance service currencies. The 'Reference costs 2011-12' document states that *'these*

currencies have been developed and agreed with ambulance trusts and commissioners to support the contracting and payment of emergency and urgent ambulance services from April 2012. The four currencies are: (a) calls; (b) hear and treat or refer; (c) see and treat or refer; and (d) see and treat and convey'. (1, p. 46).

The A&E reclassification appears to have had a smaller impact than the reclassification of Mental Health activities. Growth in A&E activity indicates a 1 to 2 percent increase in cost-weighted activity, which is lower than that observed in recent years, but broadly in line with a declining trend of growth in A&E from 2007/8 to 2010/11. As a result A&E activity remains in our estimates of productivity.

General RC data validation checks

For a number of years, concerns with the quality of the Reference Cost data submitted has led us to implement a systematic procedure that allows us to identify substantial changes in volumes or unit cost of activity between adjacent years (3, 4). This year the Payment by Result (PbR) team, acting on recommendations by the Audit Commission (5), has also implemented a series of mandatory and non-mandatory validations of the cost and activity data returned by Trusts (1, pp. 35 -38).

- Mandatory validations included checks that all data (both activity and cost) are reported, unit costs are reported as positive integers to two decimal places, no fields are missing, etc.
- Non-mandatory validations include checking that unit costs are below £5 or over £50,000 and whether single professional outpatient attendance unit costs were less than multi-professional unit costs.
- Finally, checks on 'year on year changes' are carried out. In particular, any change in total cost or activity greater than 25% is flagged and followed up. The check is carried out by department code and HRG sub-chapter for acute services, or service code for non-acute services (only for outpatient attendances, outpatient procedures and emergency medicine). It was found that *"large increases or decreases might reflect service reconfiguration or changes to coding practice. For example, one trust we spoke to that had reported a significant decrease in non-consultant led outpatient attendance costs was now reporting its midwifery services as community contacts."*(1).

Our validation process focusses on identifying large increases/decreases in either volume or unit costs of activity reported in 2010/11 and 2011/12 for all non-acute services. We find that an overwhelming majority of the large volume and cost-weighted volume changes are a result of the shift of activity from PCTs to Trusts (see the example provided for community care activity with currency code CN301AF). As such these are regarded as genuine changes and kept in our productivity calculations.

Further, there are some changes that appear to be the result of large cost changes. For example non-NHS outpatient currency code 110T had a unit cost of over £380 in 2010/11, which reduces to £75 in 2011/12 and was accompanied by a huge reduction in the volume of activity. This leads to substantial differences between the value of the cost-weighted activities in 2010/11 and 2011/12. On inspecting the full time series of the unit costs, it does appear that the 2010/11 unit costs are "incorrect" outliers. We deal with this through our method of reverting to the minimum unit costs in any two year comparison. This means that, in the 2009/10 to 2010/11 comparison, the 2010/11 unit costs are replaced by the 2009/10 unit costs, and in the 2010/11 to 2011/12 comparison, the 2010/11 costs are replaced by 2011/12 costs. As a consequence, we are still able to include this activity in our output and productivity measures.

The only exception identified for exclusion is currency code SB97Z, which refers to a chemotherapy HRG. This HRG attracts a zero tariff and has zero unit cost reported in this year's RC. In keeping with previous years, we have excluded this activity from the calculation of the output and productivity growth measures.

Outpatient activity and waiting times

Outpatient waiting times up until 2009/10 are based on data published on the Department of Health (DH) performance website, but this collection has since been discontinued. From 2010/11, we calculate waiting times for first attendances using the Outpatient Minimum Dataset⁵. These waiting times are somewhat higher than those reported previously, but year-on-year trends are virtually identical. Consequently, the move to the new data series has not had an impact on the estimates of output growth. However, to ensure consistent comparisons, growth rates up to and including 2008/9 - 2009/10 are based on data published on the DH performance website, whilst the NHS output growth rates from 2009/10 onwards are based on the figures derived from the Outpatient Minimum Dataset. Due to changes in PCT reporting which affected the RC measure of outpatient activity in 2011/12, we have also changed our evidence base for outpatient activity from RC to the Outpatient Minimum Dataset. Comparison of historical values in both datasets prior to 2011/12 indicates a very close match in volume measures and therefore there is no major consequence to this change.

Primary care

Comprehensive data on the activities performed in primary care settings remain unavailable. In their absence, nationally representative survey data have been used instead⁶. For the period 2004/5 to 2008/9 the volume of GP consultations was obtained from QResearch (6, 7). This survey has since been discontinued. Instead, we use data from the annual GP Patient Survey⁷, using the percentage of patients answering to the question "[in the past 3 months] ... When did you last see a doctor at your GP surgery or health centre?". We use these percentages to estimate the volume of consultations in the current period, taking the 2008/09 volumes as our baseline. The GP Patient Survey does not provide a breakdown by type of consultation, so we have assumed that the mix of consultations (GP home visits, GP telephone consultations, GP surgery consultations, GP other consultations, Practice Nurse consultations and other consultations) observed by QResearch in 2008/9 remains the same in subsequent years. Unit costs for the six consultation types are taken from PSSRU's Unit Costs of Health and Social Care.⁸ Data about the quality of primary care activity are obtained from the Quality and Outcomes Framework (QOF), which reports disease prevalence and achievement in reducing blood pressure for patients with coronary heart disease, transient ischaemic attacks or stroke and hypertension (8).

Community prescribing

Data about community prescribing are taken from the Prescription Cost Analysis (PCA) system, supplied by the Prescription Pricing Authority. The data are based on a full analysis of all prescriptions dispensed in the community, summarised into more than 8,000 categories defined according to chemical composition.

⁵ <http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=890>.

⁶ We expect to obtain more exact data from April 2014 onwards, once the General Practice Extraction Service (GPES) is implemented.

⁷ http://www.gp-patient.co.uk/results/download/y5q4/y5q4_Summary.pdf.

⁸ <http://www.pssru.ac.uk/project-pages/unit-costs/2011/index.php> Table 10.8b for GP costs; Table 10.6 for Nurse Practitioner costs; and Table 10.7 (nurse advanced) as a proxy for other healthcare professionals' unit costs

2.2 Measuring input

Inputs into the health care system consist of:

- Labour, such as doctors, nurses, technicians and managers;
- Intermediate goods and services, such as drugs and clinical supplies;
- Capital, such as buildings and equipment with an asset life of more than a year.

Table 3: Summary of input data sources

Input type	Data source	Deflator
NHS staff	Electronic staff record	CHE pay index from ESR data
NHS staff	Organisational financial returns	CHE pay index from ESR data
Agency staff	Organisational financial returns	NHS pay index
Intermediates	Organisational financial returns	NHS prices index
Capital	Organisational financial returns	Health Services Cost Indices for Medical & Surgical equip purchases (instead of ONS MM17 Medical, precision and optical equipment (3300) Computer Hardware and Software (instead of ONS MM17 Office machinery & computers) and “Engineering maintenance equip & materials” instead of ONS MM17 ‘Electrical machinery (3123)’
General medical, dental, ophthalmic care, family health services	DH	NHS pay index and NHS pay & prices index
Prescribing	Prescription cost analysis system	CHE pharmacy price index
Central Administration	DH	NHS pay & prices index

We construct a comprehensive index of input growth, using the workforce data and financial returns made by all NHS organisations to quantify the amount of all inputs used in the production of health care provided to NHS patients. When constructing the indices we recognise the different costs trusts face as a function of their location. To overcome this issue we adjust spending by the relevant MFF index for staff and capital. These data sources are summarised in Table 3.

NHS Staff Data

Workforce and earnings data are obtained from the NHS iView database <https://iview.ic.nhs.uk/> which draws data directly from the Electronic Staff Records (ESR), and combined Payroll and Human Resources system for the NHS. The data contain numbers of full time equivalent (FTEs) staff and earnings by 480 different occupational groups for all staff employed in the NHS.

These data do not capture agency staff, self-employed GPs and practice staff. We account for the input of these staff using expenditure data. For reporting purposes only, we use the data on GPs and GP practice staff from the Workforce census.

We use the national average earnings for each occupational group to construct a pay deflator by which to aggregate the total number of FTEs across occupational groups into a measure of total NHS labour input (see Appendix 2).

Expenditure data

We analyse financial data for all NHS organisations to construct our index of input use:

- Labour: the financial returns detail expenditure on both NHS and agency staff by broad categories of labour input.
- Intermediate inputs: include drugs and gases used in hospital, clinical supplies, catering, hotel services, uniforms, laundry, bedding, energy, establishment and premises costs. We use price deflators to wash out price changes in order to assess the amount of each type of input used.
- Capital: we account for depreciation on assets and for current outlays on equipment, making assumptions according to the asset in question about what proportion is employed in the current period.

We also account for expenditure that does not appear in organisational financial returns, including expenditure on general medical (including GPs and practice staff), dental and ophthalmic services and central administration. Data on these forms of expenditure were provided by the Department of Health.

2.3 Measuring productivity

We report estimates for two different formulations of the productivity index. These differ in how they account for growth in NHS labour inputs. Our MIXED index uses information recorded in the Electronic Staff Records; our INDIRECT method uses organisational expenditure data. Both indices capture growth in other types of input using organisational expenditure data for non-NHS staff, all intermediate inputs and capital.

3. Output growth

3.1 Hospital activity

Summarised data on the amounts of elective, non-elective and outpatient activity are reported in Table 4, together with information about mean costs, 30-day survival rates, and waiting times.

Table 4: Hospital output

Data Source	NHS Activity	Year							
		2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11(a)	2011/12(a)
Hospital episode statistics (HES)	Hospital output								
	Elective and day cases								
	Volume of activity	6,433,933	6,864,612	7,194,697	7,598,796	8,148,229	8,465,757	8,755,081	8,947,134
	Average cost (c)	1,031	1,041	1,036	1,091	1,147	1,227	1,263	1,287
	30-day survival rate	99.38%	99.47%	99.51%	99.72%	99.74%	99.76%	99.78%	99.78%
	Mean age	53.6	53.9	54.4	54.6	55	55.3	55.7	56.0
	Mean life expectancy 80 th percentile	23.7	23.7	23.6	23.5	23.2	23.4	23.4	23.3
	waiting times	104	95	89	74	60	65	76	85
	Mean waiting times	71	67	65	57	51	57	62	67
	Non-electives								
	Volume of activity	6,009,802	6,291,117	6,363,388	6,593,136	6,826,035	6,951,379	7,109,358	7,054,224
	Average cost (c)	1,210	1,241	1,244	1,237	1,354	1,413	1,460	1,506
	30-day survival rate	95.16%	95.49%	95.65%	95.79%	95.85%	96.07%	96.05%	96.12%
	Mean age	41.6	41.6	41.6	41.4	41.9	42.1	42.2	42.7
	Mean life expectancy	34.1	34.3	34.6	34.7	34.4	34.6	34.8	34.7
Ref costs	Hospital Output								
	Outpatient								
	Volume of activity	52,724,302	60,541,477	63,453,507	69,678,564	74,421,017	76,761,100	81,263,904	75,863,819
	Volume of activity (d)							80,404,193	82,197,237
	Average cost	106	103	93	94	98	99	105	108
	Mean waiting times(weeks)	7.4	6.5	5.9	3.4	3.1	3.4		
					5.3 (b)	4.8 (b)	5.1 (b)	5.3 (b)	5.3 (b)

Notes: (a) Volume of NHS activity using CIPS calculated with the new method;

(b) Derived from the HES Outpatient Minimum Database;

(c) The reported average cost does not include high-volume HRGs LA08E, PB03Z and SB97Z as they are excluded from RC;

(d) Due to changes in PCT reporting, the activity numbers for 2011/12 are not comparable to data reported in previous years. This line therefore shows the equivalent outpatient activity derived from the Outpatient Minimum Database.

Figure 1 illustrates the consistent upward trend in elective and non-elective activity (2004/5=100). Growth in elective activity has been particularly strong, increasing by 30% from 2004/5 to 2011/12, with 8.9m elective patients admitted in 2011/12.

Non-elective activity has increased by 12% over the full period, with a slight decrease recently from 7.1m in 2010/11 to 7.0m in 2011/12.

There has been a 28.3% growth in outpatient attendances over the period 2004/5 to 2010/11. However, there was a substantial decrease in recorded activity between 2010/11 and 2011/12. This might not be a true reduction but a failure to capture comprehensively data previously reported by PCTs. There is an alternative source of data about outpatient attendances, the HES Outpatient Minimum Database. Taking the equivalent categories as reported in Reference Costs, the data in the HES Outpatient data suggest that the number of attendances increased from 80.4m to 82.2m between 2010/11 and 2011/12, an increase of 2.2%. In our calculation of output growth for this pair of years, we have substituted the Reference Cost data for like-for-like HES data in accounting for outpatient activity.

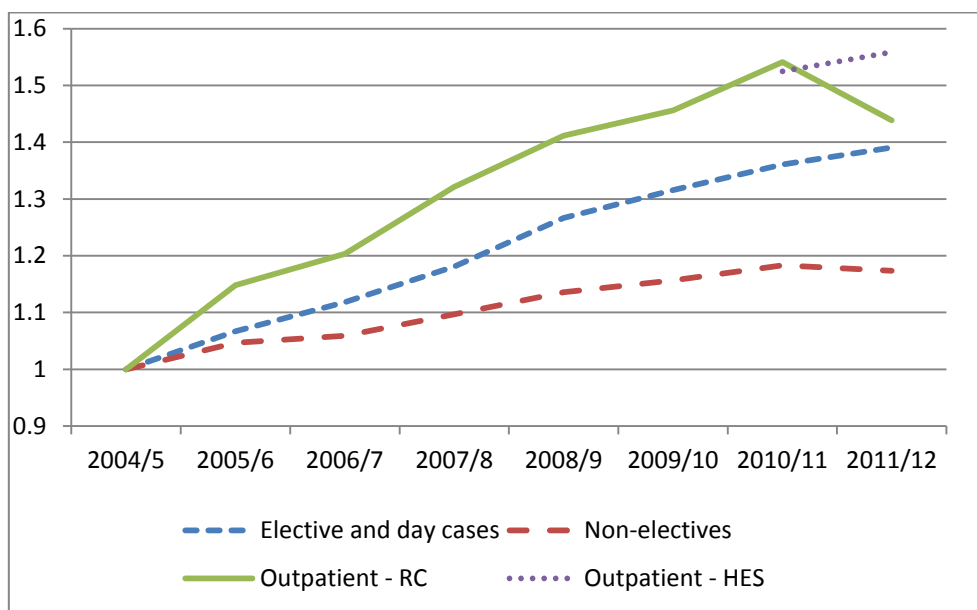


Figure 1: Trends in hospital activity

In terms of quality, 30-day survival rates have continued to improve year-on-year, as indicated in Figure 2. For elective patients, the 30-day survival rate was 99.78% in 2011/12, up from 99.38% in 2004/5. The rate for non-elective patients was 96.12% in 2011/12 compared to 95.16% in 2004/5.

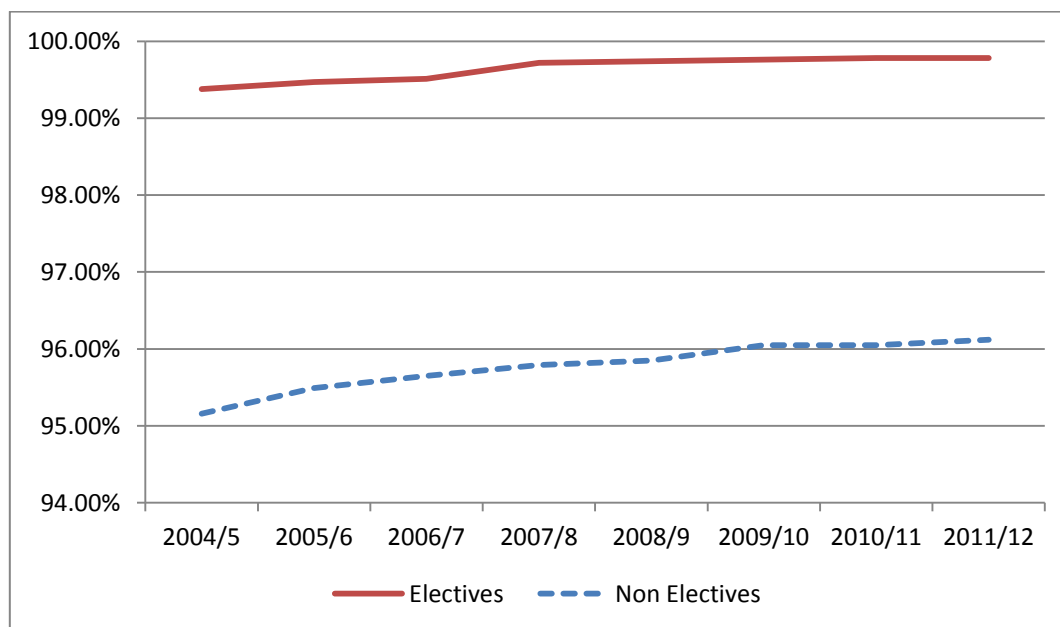


Figure2: 30-day survival rates

Trends in inpatient and outpatient waiting times are depicted in Figure 3. Waiting times declined year-on-year from 2004/5 to 2008/9. But, as can be seen, inpatient waiting times (measured at the 80th percentile) have continued to increase from their lowest level of 60 days in 2008/9 to 85 days in 2011/12. The trend in mean waiting times matches that for the 80th percentile (see Table 4).

Outpatient waiting times also fell year-on-year between 2004/5 and 2008/9, before starting to increase in 2009/10. Reporting of these data was then discontinued. We then used the Outpatient Minimum Database to calculate waiting times, these exhibiting the same year-on-year change as the alternative data for the three years over which the two series overlap. The waiting time for a outpatient attendance has also increased since 2008/9; in 2011/12 the wait was 5.3 weeks compared to 4.8 weeks in 2008/9.

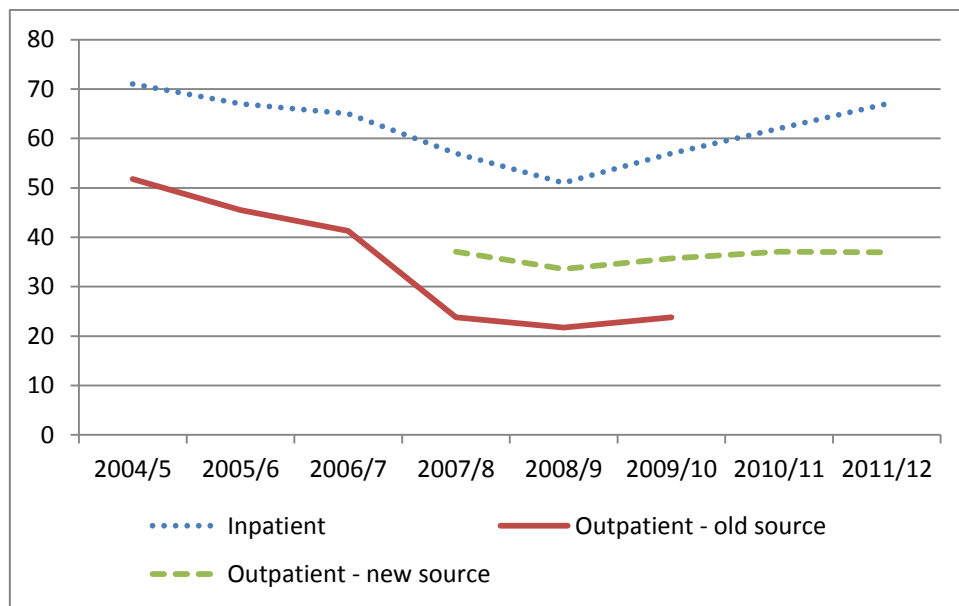


Figure 3: Trends in (mean) waiting times

3.2 Inpatient and community mental health

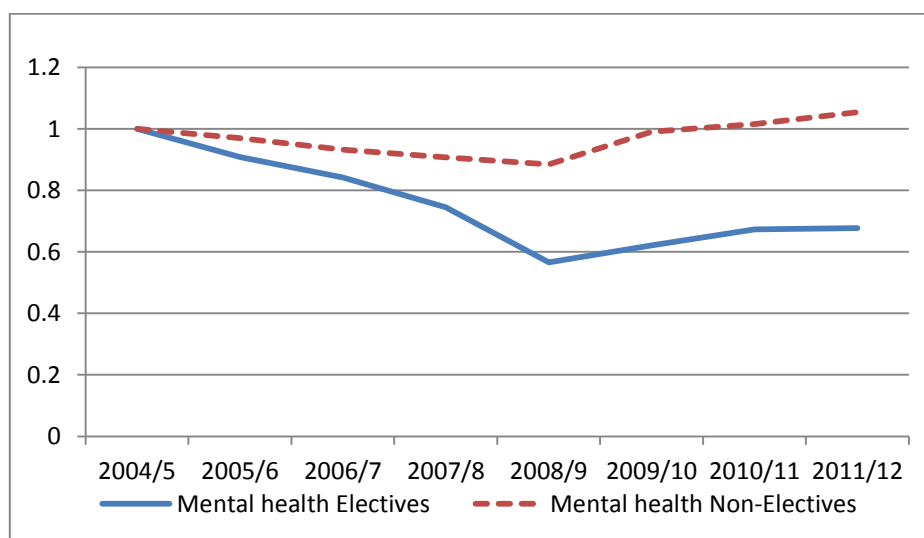
A summary of mental health activity, conducted in both hospital and community settings, is reported in Table 5.

- The gradual reduction in the amount of elective mental health care activity undertaken in hospital settings up until 2010/11 was reversed by a slight increase in 2011/12.
- Non-elective mental health care activities show a gradual decrease up to and including 2008/9, before showing a constant, albeit small, increase in subsequent years.
- In contrast there has been a steady increase in the amount of mental health care delivered in the community setting, the number of contacts increased from 16m in 2004/5 to 24m in 2010/11.
- However, the “amount” of mental health care activity reported in RC increased ten-fold in 2011/12. As discussed earlier, this is driven by the reclassification of these activities, and may also reflect capture of previously unrecorded activity. As we are unable to disentangle these elements, we do not include community mental health services in the calculation of productivity growth for 2010/11 – 2011/12.

Table 5: Output in inpatient and community mental health

Data Source	NHS Activity	Year							
		2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Hospital episode statistics (HES)	Mental health inpatient								
	<i>Elective and day cases</i>								
	Volume of activity	45,624	41,439	38,408	33,993	25,792	28,143	30,714	30,882
	Average cost	689	673	656	1,141	1,133	1,195	1,297	1,318
	30-day survival rate	97.72%	98.01%	98.15%	98.64%	98.71%	98.61%	98.85%	98.90%
	Mean life expectancy	30.1	30	30.6	29.9	29	29.4	30.2	31.2
	80 th percentile waiting times	40	265	257	28	42	28	37	37
	Non-electives								
	Volume of activity	123,983	120,203	115,560	112,475	109,636	121,610	125,823	130,654
	Average cost	1,012	1,012	1,012	1,364	1,319	1,365	1,445	1,489
	30-day survival rate	96.96%	97.22%	97.38%	97.65%	97.56%	97.68%	97.63%	97.70%
	Mean life expectancy	28.7	28.9	29	27.7	27.3	27.7	27.8	27.8
Ref Costs	Community mental health								
	Volume of activity	16,389,891	17,738,894	19,259,205	21,751,043	22,674,811	23,440,616	24,341,950	
	Volume of activity (a)								222,985,622
	Average cost	164	170	167	153	157	161	159	27

Notes: (a) Due to reclassification of activity in Community Mental Health 2011/12 data is not comparable with reported data in previous years.

**Figure 4: Trends in mental health (There was a change in calculating CIPS in year 2009/10)**

3.3 Community care

While the provision of community care has increased over time, the year-on-year trends in activity have not always been positive (Table 6). Indeed activity declined between 2005/6 and 2006/7 and then again between 2009/10 and 2010/11. Most recently there has been a steep decline between 2010/11 and 2011/12, with the number of contacts declining from 90.7m to 78.3m. Some of this decrease may be genuine, but some may be due to less comprehensive data collection in the NHS, with data previously reported by the now abolished PCTs not being captured fully in the data returns made by the organisations that have taken over responsibility for this activity.

Table 6: Community care activity

Data source	NHS activity	Year							
		2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Ref Costs	Community Care								
	Volume of activity	75,673,792	85,092,838	83,895,139	85,470,688	88,513,663	92,412,727	90,724,524	78,315,576
	Average cost	39	38	40	42	45	46	47	50

To investigate the sharp decline in 2011/12, we have summarised community care activity according to the broad categories reported in the Reference Cost data collection. These are shown in Table 7.

- Most, but not all, categories were subject to a reduction in the cost-weighted growth between 2010/11 and 2011/12 (the exception being the smaller volume category Medical Services). Some of these reductions may be due to incomplete data capture, but how much is impossible to discern.
- Looking over the full series, no clear trends in growth rates appear for any of these categories, whether in terms of raw growth (number of contacts) or in cost-weighted growth, which takes account of the mix of activity within each category. Hence, it is difficult to make predictions from past trends about what the true level of activity might have been in 2011/12.
- There is no alternative data source about community care activity. But if, as likely, there is a relationship between the number of staff and the amount of activity, looking at changes in staffing levels might give some insight into whether observed reductions are accurate. Community care staffing levels, summarised from the ESR, are reported in Table 8.
- According to the ESR data, the number of FTE district nurses has fallen over time. This suggests that there has indeed been a reduction in the actual volume of District Nursing Services contacts, though perhaps not to the extent suggested by the Reference Cost data.
- In contrast, there have been increases in the number of health visitors. This is in stark contrast to the successive year-on-year reductions in the volume of health visitor contacts. This would suggest that the Reference Costs are not now capturing all health visitor activity but, again, it is impossible to gauge what the unreported shortfall amounts to.
- On balance, we have decided to use the data reported in the Reference Costs to account for community care activity. If under-reporting of activity by PCTs has indeed been taking place, we expect the estimates of productivity for 2010/11 – 2011/12 to be an under-estimate. Should data be re-captured accurately in the next period, productivity growth for 2011/12 – 2012/13 will then be over-estimated. In due course, over a three year period, the under-reporting estimation error should be smoothed out.

Table 7: Community care by broad category ('000 contacts)

	2007/08		2008/09		2009/10		2010/11		2011/12	
	Activity	CW Growth	Activity	CW Growth	Activity	CW Growth	Activity	CW Growth	Activity	CW Growth
Medical Services	511	n/a	425	1.5%	475	11.4%	419	-10.3%	465	15.4%
Midwifery Services	5,355	n/a	5,423	-0.2%	5,373	-0.6%	5,158	-6.4%	5,002	-3.7%
District Nursing Services	32,818	n/a	32,232	-2.8%	32,155	0.7%	32,539	1.3%	27,127	-13.3%
Health Visiting Services	17,011	n/a	17,437	0.5%	17,380	0.5%	16,435	1.5%	13,849	-17.4%
Nursing Services for Children	5,505	n/a	6,569	18.8%	8,145	23.7%	7,189	-6.3%	5,677	-12.6%
Rehabilitation Teams	1,612	n/a	1,829	13.4%	2,300	26.7%	2,316	14.3%	2,395	-6.2%
Therapy Services	8,104	n/a	8,397	5.2%	8,616	3.4%	8,711	2.9%	8,267	-6.5%
Other Services	14,657	n/a	16,201	10.6%	18,059	12.3%	18,004	-0.4%	15,534	-8.3%
Total	85,574	n/a	88,514	4.0%	92,503	6.4%	90,771	2.5%	78,316	-9.9%

Table 8: Community care staff levels and growth rates, 2007/08 – 2011/12 (ESR)

	2007/08		2008/09		2009/10		2010/11		2011/12	
Staff Category	FTE	% increase	FTE	% increase	FTE	% increase	FTE	% increase	FTE	% increase
District Nurses (1)	12,918	-	12,588	-2.59%	12,453	-1.05%	12,118	-2.73%	11,785	-2.75%
Health Visitor	8,784	-	8,572	-2.42%	8,299	-3.18%	8,150	-1.79%	8,685	6.56%
Community Health Service Medical (2)	1,088		1,253	9.83%	1,316	5.30%	1,079	-17.72%	994	-7.97%

(1) Including Community Psychiatry, Community Learning Disabilities, and Community Services District Nurses.

(2) Including Locums and Community & Public Health Medical category.

3.3 Primary care

We have two broad measures of activity in primary care: the number of consultations and the number of prescription items dispensed. Data for both of these measures is summarised in Table 9. The number of prescription items has been gradually increasing from 2004/5, amounting to 937m items in 2011/12.

Table 9: Output in primary care

NHS Activity	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Primary Care								
General Practice Consultations								
Volume of activity (000 contacts)	265,600	283,100	293,000	292,500	300,400	300,400	293,517	303,820
Quality adjusted volume	274,122	293,732	305,517	305,291	313,814	313,988	303,355	317,893
Average cost	20	21	25	26	27	28	29	33
Prescription items								
Volume of activity (000 items)	691,949	733,011	762,632	803,297	852,482	897,727	936,744	973,382
Average cost	12	11	11	10	10	10	9	9

Data about the number and cost of consultations are reported in Table 10, broken down by consultation type. For years after 2008/9 we only have access to aggregated data from the GP

Patient Survey reporting total activity; the breakdown to different activity categories is based on the 2008/9 QResearch data with the assumption that the relative proportions of activity types did not change. The GP Patient Survey suggests that consultation rates were unchanged between 2008/9 and 2009/10,⁹ fell between 2009/10 and 2010/11, and increased again between 2010/11 and 2011/12. In 2014 we expect to obtain more reliable data on GP activity by using data provided by the General Practice Extraction Service (GPES).¹⁰

Table 11 reports the trends in prevalence and achievement in reducing blood pressure for patients with CHD, stroke and hypertension. The trend was positive for all the selected conditions in the recent years; the only exception is CHD where we observe a slight decline in QOF achievement in 2011/12. After accounting for changes in quality our data shows a 3.89% increase in GP activity between 2010/11 and 2011/12.

Table 10: Consultations by type

	2004/05		2005/06		2006/07		2007/08		2008/09		2009/10(a)		2010/11(a)		2011/12(a)	
	activity	cost	activity	cost	activity	cost	activity	cost	activity	cost	activity	cost	activity	cost	activity	cost
GP Home visit	5,800	69	6,000	69	5,900	55	5,900	58	6,000	117	6,000	120	5,793	121	6,068	110
GP Telephone	12,500	30	14,000	27	15,100	21	16,200	22	18,700	21	18,700	22	18,055	22	18,913	26
GP Surgery	148,300	24	153,900	24	156,600	34	155,800	36	158,800	35	158,800	36	153,324	36	160,608	43
GP Other	4,200	24	4,800	24	5,000	34	4,800	36	5,500	35	5,500	36	5,310	36	5,563	43
Practice Nurse	84,600	10	93,700	10	99,000	9	98,500	11	100,600	11	100,600	12	97,131	13	101,745	14
Other Clinicians	10,200	15	10,700	15	11,400	14	11,300	15	10,800	14	10,800	17	10,428	25	10,923	25
Total	265,600	20	283,100	20	293,000	25	292,500	26	300,400	27	300,400	28	290,041	29	303,820	33

Note: (a) General Practice consultations are estimated using the GP Patient Survey.

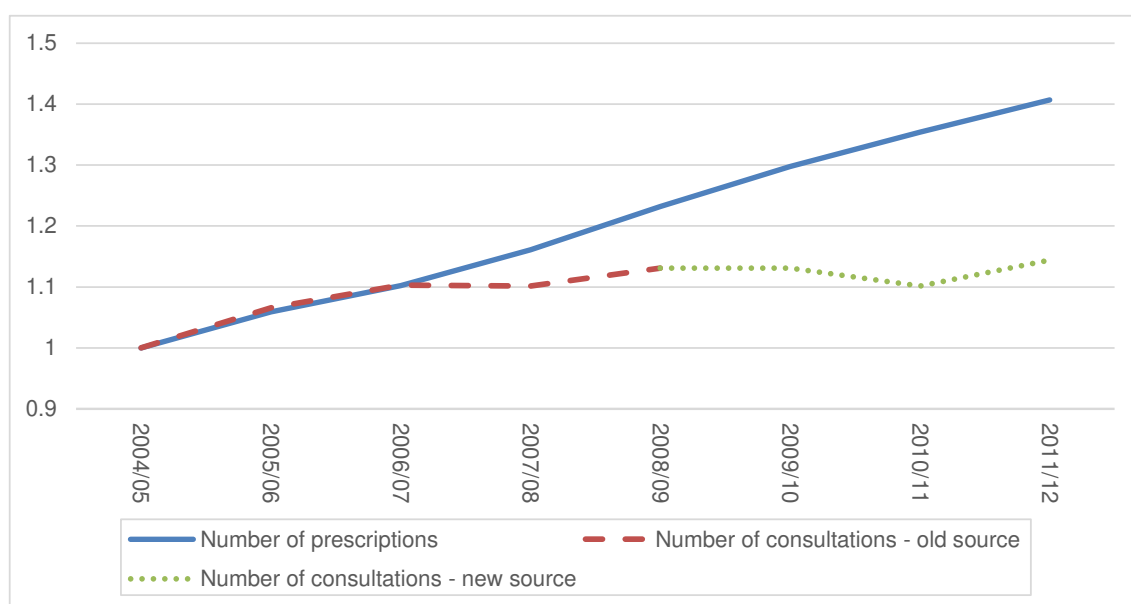


Figure 5: Trends in growth in primary care

⁹ As do data from the General Lifestyle Survey.

¹⁰ <http://www.hscic.gov.uk/gpes>

Table 11: Rates of prevalence and achievement in reducing blood pressure

	Prevalence			QOF achievement		
	CHD	Stroke	Hypertension	CHD	Stroke	Hypertension
2004/05	3.57	1.63	10.41	78.60	73.13	64.33
2005/06	3.57	1.66	11.48	84.44	81.22	71.05
2006/07	3.54	1.61	12.49	88.86	86.92	77.62
2007/08	3.50	1.63	12.79	89.41	87.51	78.35
2008/09	3.47	1.66	13.13	89.68	87.88	78.56
2009/10	3.44	1.68	13.35	89.77	88.12	78.72
2010/11	3.40	1.71	13.52	90.16	88.57	79.30
2011/12	3.38	1.74	13.63	90.14	88.61	79.65

3.4 A&E activity

We report A&E activity of different types in Table 12. Activity in hospital A&E departments has increased progressively over time, both for people who are subsequently admitted or not. While activity in Minor Injuries Units and Walk in Centres rose year-on-year from 2004/5, there were marked decreases in 2011/12. Overall activity in non-24 hour units has increased progressively over time.

Table 12: Accident and Emergency data

	2007/8	2008/9	2009/10	2010/11	2011/12
Leading to admitted					
Volume of activity	3,250,623	3,426,752	4,047,176	4,004,852	4,040,760
Average cost (£)	123	133	134	141	150
Not leading to admitted					
Volume of activity	8,862,947	9,657,005	10,075,701	9,881,745	10,405,762
Average cost (£)	90	95	103	108	108
Minor injury unit (AD)					
Volume of activity	181,817	158,892	526,556	555,123	199,816
Average cost (£)	92	74	48	64	74
Minor injury unit (NAD)					
Volume of activity	666,510	876,796	1,741,880	1,927,125	1,606,657
Average cost (£)	61	60	54	61	60
Walk in centre (AD)					
Volume of activity	201,979	454,852	392,242	306,514	92,610
Average cost (£)	97	91	48	31	42
Walk in centre (NAD)					
Volume of activity	1,578,959	1,612,725	1,492,736	1,485,251	1,251,374
Average cost (£)	51	49	40	40	42
Non24h centre (AD)					
Volume of activity	100,136	94,234	171,852	283,488	324,386
Average cost (£)	81	111	54	90	100
Non24h centre (NAD)					
Volume of activity	209,798	407,303	257,279	260,979	246,717
Average cost (£)	48	72	75	88	53

3.5 Other activities

Other types of activity reported in the Reference Costs are summarised in Table 13. The way of classifying these activities has changed somewhat over time, so only data from 2007/8 are reported. Details for previous years are provided in a previous report (9). For all types of activity, other than Rehabilitation, there have been year-on-year increases in volume.

Radiotherapy & High Cost Drugs underwent a reclassification in 2010/11 of how these services are described. This resulted in lower amounts of activity being recorded, but with higher unit costs. The provision of these services increased between 2010/11 and 2011/12.

Table 13: Breakdown of different types of activity from reference costs

	2007/8	2008/9	2009/10	2010/11	2011/12
Radiotherapy & High Cost Drugs					
Volume of activity	11,851,877	16,598,539	6,150,933	5,342,811	6,246,953
Average cost (£)	82	92	320	409	396
Diagnostic Tests					
Volume of activity	258,217,386	279,722,459	301,073,413	321,876,384	338,749,079
Radiology					
Volume of activity	7,614,437	7,852,498	8,347,404	8,491,834	8,758,136
Average cost (£)	103	102	104	97	93
Rehabilitation					
Volume of activity	2,732,048	3,277,757	3,277,430	3,314,085	2,897,721
Average cost (£)	259	265	279	285	278
Renal Dialysis					
Volume of activity	3,980,793	4,091,245	4,050,658	4,088,817	4,166,150
Average cost (£)	114	120	129	129	129
Opth&Dentistry					
Volume of activity	47,034,815	48,704,692	50,401,166	51,183,058	51,876,392
Average cost (£)	32	33	33	34	36
Specialist Services					
Volume of activity	2,782,643	3,052,954	3,244,160	3,465,453	3,968,258
Average cost (£)	820	840	850	818	714
Other NHS Activity (1)					
Volume of activity	4,401,019	4,782,324	4,767,718	4,789,366	4,809,199
Average cost (£)	71	72	72	75	73

3.6 Output growth

Output growth is measured by combining activities of different types into a single index using costs to reflect their values. This generates our cost-weighted output growth index, which increased by 2.38% between 2010/11 and 2011/12. We then re-scale each type of cost-weighted output according to changes in survival rates, health improvements and waiting times. This generates our quality-adjusted index, which increased by 3.15% between 2010/11 and 2011/12.

Table 14: Output growth

Output growth	All NHS	
	Cost-weighted growth	Quality adjusted CW growth
2004/5-5/6	6.53%	7.11%
2005/6-6/7	5.88%	6.50%
2006/7-7/8	3.41%	3.66%
2007/8-8/9	5.34%	5.73%
2008/9-9/10	3.44%	4.11%
2009/10-10/11	3.61%	4.57%
2011/11-11/12	2.38%	3.15%

Table 15: Full time equivalent NHS staff numbers (a)

	2004/5	2005/6	2006/7	2007/8 (b)	2007/8	2008/9	2009/10	2010/11	2011/12
Medical staff	78,462	82,568	85,975	84,226	82,790	88,647	91,604	95,077	97,367
GPs (c)	33,564	34,855	35,944	36,008	36,420	37,720	40,269	39,409	39,780
GP Practice staff (c)	69,140	72,006	72,990	76,977	75,085	73,292	72,153	73,306	
GP Practice staff – new method								82,802	84,609
Ambulance staff					21,149	23,084	24,489	25,056	24,910
Administration and Estates staff					237,264	243,018	262,479	263,723	251,615
Health care assistants and other support staff					101,114	106,406	112,710	114,786	117,270
Nursing, midwifery and health visiting staff					363,344	369,509	377,308	377,938	376,835
Nursing, midwifery and health visiting learners					3,176	2,623	2,533	2,644	3,024
Scientific, therapeutic and technical staff					104,866	111,321	118,935	123,875	128,133
Healthcare scientists					36,888	38,735	40,603	41,539	41,480
Unknown					1,056	555	428	56	14
Non-funded staff					3,273	3,046	3,038	3,299	3,065
Professionally qualified clinical staff	412,013	425,044	425,983	425,983					
Support to clinical staff	271,347	278,994	273,202	273,202					
NHS infrastructure support staff	178,530	186,510	178,230	178,230					
TOTAL	1,084,007	1,120,225	1,111,428	1,117,291	1,108,715	1,139,147	1,188,664	1,224,233	1,217,670
Annual Growth FTE		3.32%	-0.39%	-0.34%	-0.63%	2.88%	4.24%	1.50%	-0.21%
Labour Index		3.44%	0.64%	N/A	0.64%	4.22%	4.55%	1.29%	-0.24%

Notes: (a) FTE data from 2007/08 onwards is taken from organisational returns of Electronic Staff Records. When there are 5 or less people employed in an occupational group, organisations report either 5 or 0; these totals therefore will differ from the those derived from national level data;

(b) 2007/08 Workforce Census data is included for comparison purposes only;

(c) Data for GPs and GP practice staff is not available from ESR; Workforce Census data is used instead; there were also changes in counting of GP Practice staff therefore 2010/11 and 2011/12 years are not comparable to previous years.

4. Input growth

4.1 Staff numbers

Summarised from 480 staff categories in ESR data,¹¹ Table 15 reports NHS staff numbers (as Full Time Equivalents (FTEs)) aggregated in major staff groups for each year from 2004/5, while Figure 6 and Figure 7 present the information graphically. For years prior to 2007/8, we use data from the Workforce Census, 2007/8 being an overlapping year. Data for GP and Practice staff is taken from the Workforce Census and are presented in the table for informative purposes only. They are not used in the calculation of the labour index as they are included in the primary care expenditure data. Moreover, there has been a change in the way GP practice staff is reported in the Workforce Census, and therefore the years 2010/11 and 2011/12 are not directly comparable to previous years.

The data show gradual growth over time in most staffing groups up to the year 2010/11. The exceptions are ambulance staff, nursing staff and administration and estates staff, where we see a slight decrease in the total FTE numbers in 2011/12. In 2011/12, the NHS employed 1.21m FTEs, representing a 10% increase from 2004/5. Annual growth in FTEs has been uneven, with a decrease of 0.21% between 2010/11 and 2011/12.

The final row of Table 15 reports the growth in labour input, which takes account of both the number of FTEs and the wage rate for each occupational group. Over time there may have been changes in the staffing mix, and a simple count of the numbers employed fails to capture changes in the composition of staffing. The index of labour input growth overcomes this by weighting the number of staff of each type by their respective wages. For the entire period, the index of labour input growth is almost always greater than the growth in FTEs. This implies that there has been a progressive shift of staff toward higher wage categories. Between 2010/11 and 2011/12 there was a 0.21% decline in the total FTE count and a decrease of 0.24% in labour input growth. Over the full time period 2004/5 - 2011/12 NHS labour input increased by 15%.

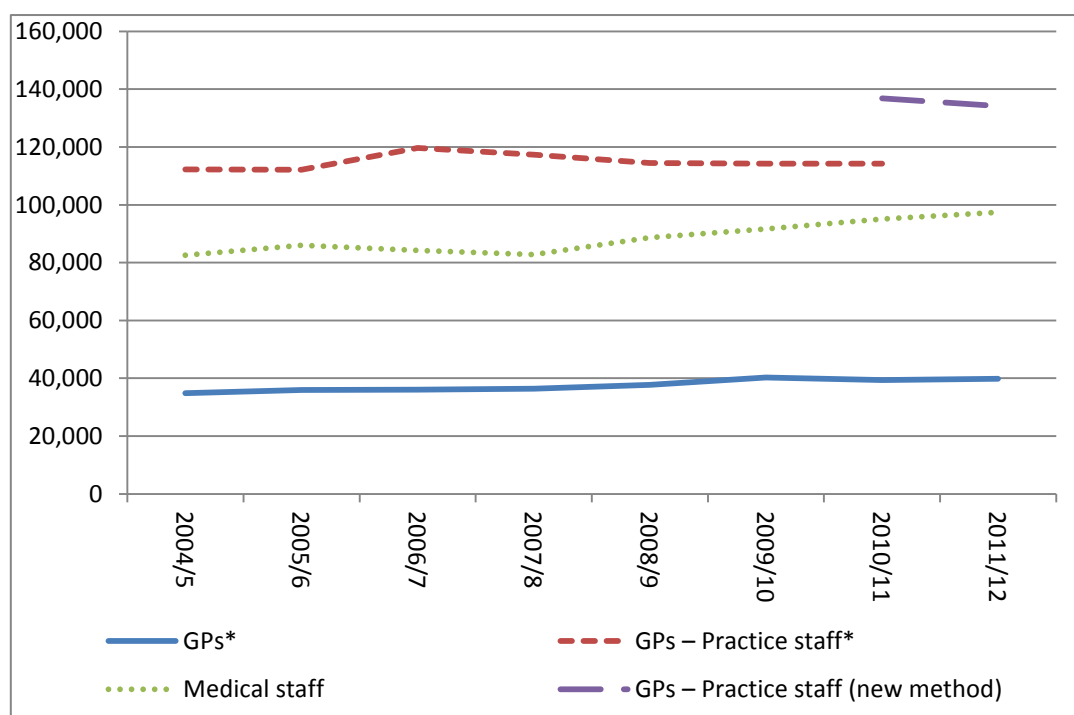


Figure 6: Trends in growth of medical and dental staff and GPs

¹¹ We exclude one organisation from the ESR data reported in 2011/12 that had not appeared in previous years.

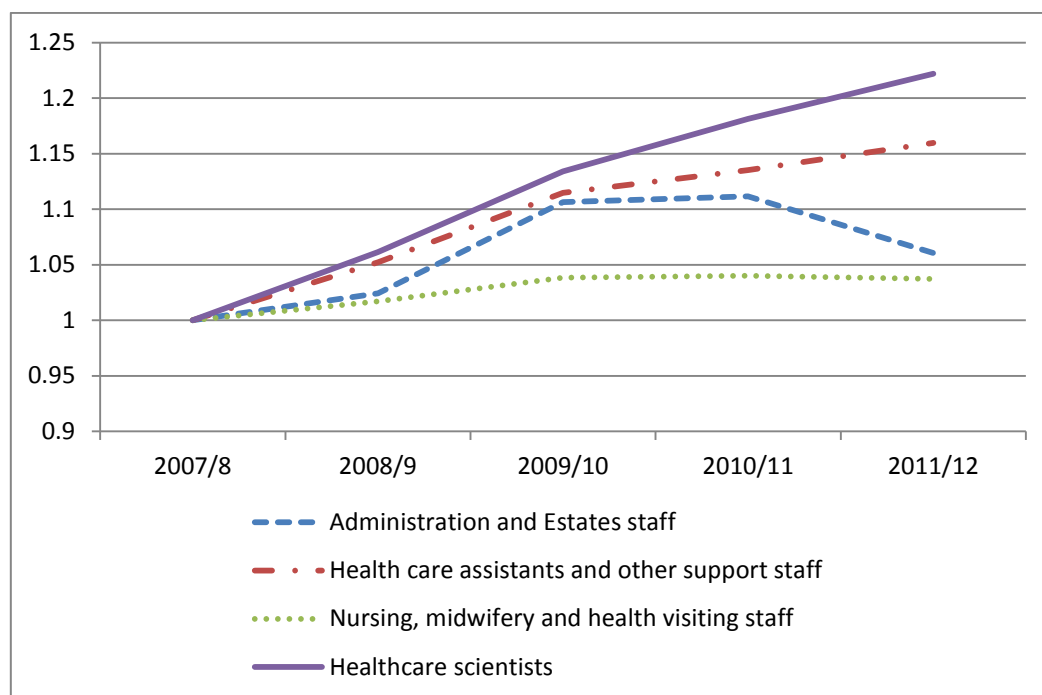


Figure 7: Growth in non-medical staff, rebased to 2007/08

4.2 Input use derived from expenditure data

In Table 16 and Table 17 we present a breakdown of expenditure by macro groupings for PCTs and all Trusts, respectively. A detailed breakdown of current expenditure for Trusts, PCTs and SHAs is provided in Appendix 3.

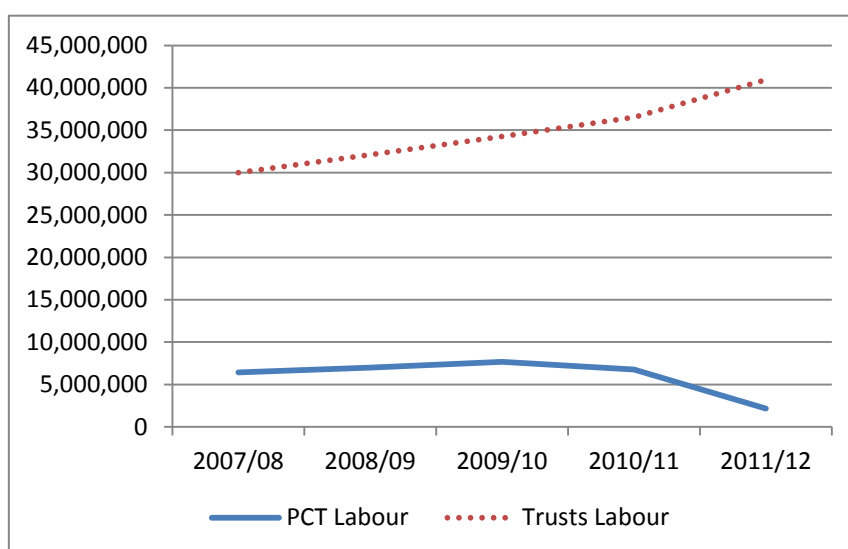
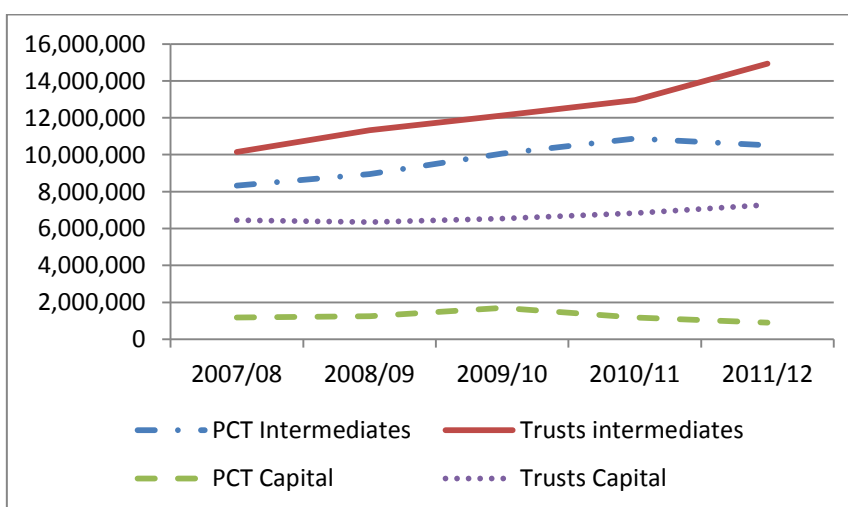
Table 16: Current and constant expenditure for PCTs

	2007/08	2008/09	2009/10	2010/11	2011/12
Current					
NHS staff	6,418,594	6,996,578	7,658,575	6,784,016	2,183,240
Agency staff	282,634	482,375	571,766	391,383	145,074
Intermediates without non-NHS spend	2,617,114	2,526,610	2,623,459	2,638,638	2,052,029
Capital costs	1,174,841	1,247,997	1,703,974	1,171,813	892,604
Constant					
NHS staff	7,023,250	7,409,404	7,967,055	6,807,843	2,183,240
Agency staff	308,290	510,837	594,796	392,758	145,074
Intermediates without non-NHS spend	2,864,872	2,640,390	2,781,409	2,731,073	2,052,029
Capital costs	871,259	863,252	1,314,834	833,328	751,268

Table 17: Current and constant expenditure for all Trusts

	2007/08	2008/09	2009/10	2010/11	2011/12
Current					
NHS staff	29,975,525	32,041,487	34,284,053	36,510,927	40,937,972
Agency staff	909,031	1,393,732	1,699,728	1,712,024	1,709,917
Intermediates	10,140,836	11,322,441	12,115,273	12,961,217	14,941,588
Capital without impairments	6,452,630	6,340,019	6,529,977	6,839,898	7,278,435
Constant					
NHS staff	32,603,522	33,853,279	35,464,941	36,968,916	40,937,972
Agency staff	988,400	1,469,942	1,760,043	1,733,499	1,709,917
Intermediates	11,384,545	11,836,426	12,732,940	13,501,270	14,941,588
Capital without impairments	3,413,393	3,266,000	3,244,812	3,258,707	3,251,223

As would be expected, there has been a substantial reduction in expenditure by PCTs, especially in terms of staffing. The drop is mirrored by a substantial increase in expenditure by Trusts, which suggests a transfer of personnel from PCTs to Trusts.

**Figure 8: PCT and trust expenditure on Labour****Figure 9: PCT and Trust expenditure on capital and intermediate items**

In Table 18 we report expenditure in current and constant terms across all the major expenditure categories. To derive estimates of volume growth in input use from the expenditure data, it is necessary to wash out price changes from the expenditure series. By applying a price deflator, current expenditure is converted into constant expenditure. Changes in constant expenditure are driven by changes in the volume not the price of inputs. The expenditure series shows that total expenditure in constant terms has increased considerably over time, from £70bn in 2004/5 to £89bn in 2011/12.

Table 18: Total expenditure breakdown with intermediates data from RC

	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Current								
NHS staff	31,334,252	33,926,746	35,177,509	36,561,167	39,264,185	42,104,673	43,513,839	43,360,622
Agency	1,557,282	1,459,936	1,185,244	1,207,654	1,895,423	2,302,578	2,127,889	1,872,598
Intermediate (1)	8,757,990	10,271,344	11,378,727	13,036,200	13,991,803	14,911,074	16,077,609	17,221,673
Capital costs	5,115,514	5,839,664	6,568,363	7,784,592	7,426,031	7,635,390	8,025,361	8,265,079
Prescribing	8,094,175	8,013,483	8,250,324	8,303,501	8,376,264	8,621,421	8,880,735	8,777,965
Primary Care	9,569,836	11,162,141	11,209,422	11,697,639	12,074,672	12,683,418	12,962,081	13,250,874
DH Core	278,000	262,000	229,000	226,000	242,958	241,608	212,245	453,000
TOTAL	64,707,050	70,935,314	73,998,589	78,816,753	83,271,336	88,500,162	91,799,759	93,201,811
Constant								
NHS staff	38,346,300	39,655,155	39,497,699	39,664,411	41,345,323	43,559,337	43,666,672	43,360,622
Agency	1,674,940	1,445,800	1,093,340	1,310,158	1,995,888	2,382,128	2,135,363	1,872,598
Intermediate (1)	9,095,402	10,873,689	11,885,321	13,647,977	14,437,459	15,751,862	16,388,184	17,221,673
Capital costs	3,308,036	3,578,676	4,190,683	4,292,293	4,134,163	4,568,449	4,120,671	4,013,538
Prescribing	5,931,102	6,514,497	6,944,133	7,229,236	7,655,849	8,168,866	8,524,415	8,777,965
Primary Care	11,670,405	13,001,164	12,542,013	12,911,230	12,939,203	13,351,213	13,234,285	13,250,874
DH Core	331,183	300,986	253,689	248,419	257,034	254,082	216,702	453,000
TOTAL	70,357,368	75,369,967	76,406,878	79,303,724	82,764,919	88,035,937	88,286,292	88,950,270

Note (1) We use Reference Costs to calculate for purchases of health care from non-NHS providers. See Appendix 1 for details

4.3 Input growth

Our measures of input growth are reported in Table 19, differentiated according to the use of the Mixed or Indirect index. Estimates of input growth are generally higher if using the Mixed rather than the Indirect input index, particularly for the most recent years.

Table 19: Input growth

Input Growth	All NHS	
	Mixed	Indirect
2004/05 – 05/06	7.19%	7.10%
2005/06 – 06/07	1.92%	1.36%
2006/07 – 07/08	3.88%	3.70%
2007/08 – 08/09	4.23%	4.24%
2008/09 – 09/10	5.43%	5.83%
2009/10 – 10/11	1.33%	0.80%
2010/11 – 11/12	1.00%	0.75%

The difference between the two input indices is because the growth rate in labour input is often higher if based on data from ESR than if based on expenditure growth from TFR. The differences are

shown in Table 20. Consider the change from 2010/11 to 2011/12. According to the TFR data reported in Table 17, expenditure on staff in constant terms appears to have fallen by 0.70%, while the ESR data suggest that the decrease was only 0.24%.

Table 20: Differences in estimates of labour input growth

	2006/07 - 2007/08	2007/08 - 2008/09	2008/09 - 2009/10	2009/10 - 2010/11	2010/11 - 2011/12
TFR growth	-0.40%	4.18%	5.30%	0.62%	-0.70%
ESR FTE growth	-0.63%	2.88%	4.24%	1.50%	-0.21%
ESR growth	0.64%	4.22%	4.55%	1.29%	-0.24%
Labour exp as a % of total exp	50%	50%	50%	49%	49%

5. Productivity growth

Quality adjusted productivity growth figures over the period 2004/05 to 2010/11 are provided in Table 21.

Table 21: Productivity growth year on year

Input Growth	All NHS	
	Mixed	Indirect
2004/05 – 05/06	-0.07%	0.01%
2005/06 – 06/07	4.50%	5.07%
2006/07 – 07/08	-0.21%	-0.04%
2007/08 – 08/09	1.44%	1.43%
2008/09 – 09/10	-1.25%	-1.63%
2009/10 – 10/11	3.21%	3.74%
2010/11 – 11/12	2.13%	2.38%

We find that regardless of whether we use the mixed or indirect approach to capturing input growth, productivity growth between 2010/11 and 2011/12 is positive, ranging from 2.13% to 2.38%. This is lower than the previous period's growth but represents a break in the positive/negative sequence between years observed previously.

Overall a second consecutive year of productivity growth adds to the general trend of total factor productivity growth since 2004/5, with an overall total factor productivity growth of 10% to 11% since 2004 as shown in Table 22 and Figure 10.

Table 22: Total factor productivity index

	Productivity Growth Index	
	Mixed	Indirect
2004/5	1	1
2005/6	0.999	1.000
2006/7	1.044	1.051
2007/8	1.042	1.050
2008/9	1.057	1.065
2009/10	1.044	1.048
2010/11	1.077	1.087
2011/12	1.100	1.113

There are, however, a couple of caveats that need to be stated. Firstly, the complete reclassification and recording of previously unrecorded activity in community mental health meant these activities had to be omitted in the construction of the output and productivity measures for 2010/11 – 2011/12. If community mental health output grew at a substantially different rate to the average output growth then the productivity figures would be biased. There is, however, no way of knowing whether this is the case or in what direction the bias might operate.

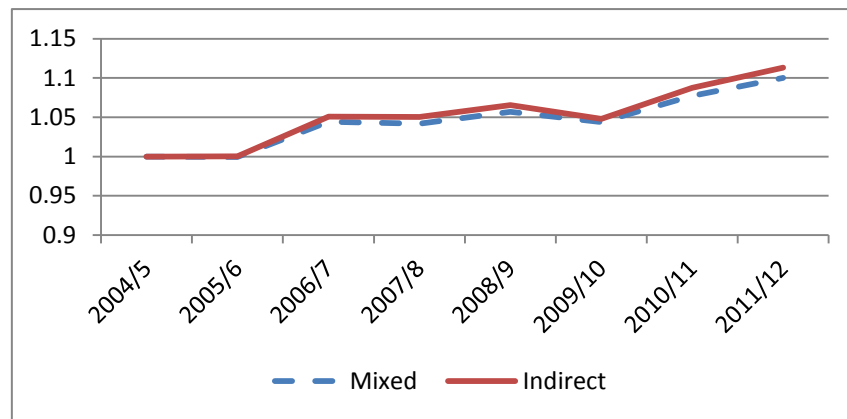


Figure 10: Total factor productivity index over time

Secondly, and probably more importantly, there is likely to be under-reporting of some types of activity, brought about by the dissolution of PCTs that previously made Reference Costs returns. Much of the old PCT activity appears to have been displaced to Trusts and, therefore, is now captured by these organisations in their Reference Cost returns. But it is not clear that all of this displaced activity is being captured comprehensively – the observed declines in outpatient activity and community care activity suggest that some activity is indeed being missed. We are able to resolve this for outpatient activity, for which an alternative data source exists. But no equivalent dataset for community care activity exists and therefore an unknown quantity of unrecorded activity is probably not being captured. We are forced to make the assumption that there is no unreported activity for these activities. This conservative assumption, therefore, implies that the reported productivity growth figures are an underestimate of the true productivity growth.

6. Conclusions

We find positive productivity growth over the period 2010/11 to 2011/12, a second consecutive year of productivity growth which adds to the overall positive trend. This is despite a potential under-reporting of some community care activity and the reclassification of community mental health activity and cystic fibrosis, which are not accounted for in the output and productivity measures for the last two years of the series.

It is worth noting that these successive periods of year-on-year productivity growth break a sequence of positive/negative productivity growth observed since 2004/5. Generally, the alternating sequence of negative productivity growth rates following positive rates appears to be driven by (lagged) fluctuations in input growth over time. But recent productivity growth is a function of below average output growth combined with a substantially below average growth in inputs. In fact, recent output growth and input growth are both at their lowest recorded levels. The emphasis on austerity appears to have ensured that input growth has remained at a level lower than the average observed over the preceding time period.

The time series of productivity growth rates suggest a potential lagged impact between inputs and outputs, with large output growth occurring in the year following a large input growth. If this is true, then the lowest observed output growth this year may partly be a function of what was the lowest recorded input growth in the previous year. Similarly, the full impact of the new lowest input growth may not become completely apparent until next year's output is measured.

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Appendix 1: Expenditure on non-NHS bodies

The financial returns for all NHS organisations include purchases of health care from non-NHS providers. This category accounts for the largest share of expenditure by PCTs, capturing care purchased from the voluntary sector, charitable institutions and local authorities for older people and those with mental or physical disabilities, and acute care for NHS patients purchased from the private sector (10, 11). Many of these services are not captured in the Reference Costs, particularly those that are social care related rather than health care. Table 23 reports the total value of services from non-NHS providers that are included in the Reference Costs collection and the total value of purchases made by PCTs, Trusts and Foundations Trusts as reported in their financial returns. In recognition of the wider coverage of data reported in the financial returns, our estimates of productivity growth are based on activity (output) and expenditure (input) reported in the Reference Costs.

Table 23: Current expenditure on services from non-NHS providers (pounds 000s)

	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
A. Expenditure of non-NHS providers reported in Reference Costs ¹	112,009	152,953	196,757	194,398	229,603	334,167	381,495	152,927
B. PCT purchase of healthcare from non-NHS providers	3,336,014	4,096,300	4,651,748	5,712,897	6,422,652	7,440,538	8,235,200	8,453,789
C. Foundation Trusts purchase of health care from non-NHS providers	15,039	19,551	47,539	134,712	222,702	240,194	242,469	292,739
D. Trusts purchase of health care from non-NHS providers	344,254	319,231	292,770	294,919	236,863	199,563	218,440	222,749
A / B (%)	3.4%	3.7%	4.2%	3.4%	3.6%	4.5%	4.6%	1.8%

¹ This excludes expenditure on inpatient mental health care, this activity being captured in HES.

Appendix 2: Deflators

For information, the deflators that we employ are listed below.

Table 24: Deflators

	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
DH pay index	0.81	0.85	0.88	0.92	0.94	0.96	0.99	1
DH Prices Index	0.84	0.85	0.88	0.89	0.94	0.93	0.96	1
DH Pay and Prices Index	0.82	0.85	0.88	0.91	0.94	0.95	0.98	1
CHE drugs index	1.41	1.27	1.23	1.15	1.10	1.06	1.04	1
CHE Pay index					0.95	0.97	1.00	1

Appendix 3: Organisational expenditure

Table 25: Current expenditure on NHS staff salaries and wages (£000)

	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Hospital and ambulance trusts								
Total Senior Managers & Managers	1,187,336	1,182,277	1,098,955	919,042	814,855	796,298	836,071	871,950
Total Medical Staff (including locums)	5,974,802	5,991,919	5,750,359	5,223,513	4,755,459	4,448,401	4,387,799	4,351,268
Total Dental Staff (including locums)	56,983	52,674	46,746	37,646	35,403	33,140	56,307	74,335
Total Nursing Midwifery & Health Visiting Staff	8,477,812	8,538,790	8,204,900	7,321,781	6,410,853	5,923,809	6,120,421	6,766,839
Total Scientific, Therapeutic & Technical Staff	2,942,535	2,994,992	2,904,196	2,581,216	2,310,988	2,192,407	2,394,988	2,638,828
Administrative and clerical	2,452,099	2,505,810	2,408,654	2,163,292	2,021,146	1,934,670	2,028,264	2,154,458
Healthcare Assistants and other Support Staff	1,115,684	1,166,179	1,130,289	1,017,431	944,590	878,497	1,015,203	1,065,372
Maintenance and works staff	219,448	210,717	195,169	173,882	149,775	134,844	119,866	107,153
Ambulance staff	662,651	737,866	773,365	832,961	915,701	961,293	977,907	840,421
Other employees	73,900	90,480	70,183	98,180	45,036	39,015	46,976	39,366
Chairman & Non-Executive Directors	16,125	15,226	12,232	11,560	8,083	6,779	7,465	6,549
Total NHS staff - hospital & ambulance	23,179,373	23,486,930	22,595,048	20,380,504	18,411,887	17,349,153	17,991,267	18,916,540
Foundation Trusts								
NHS Staff	2,471,600	4,075,900	6,026,996	9,520,162	13,519,900	16,802,900	18,376,975	21,865,058
Chairman & Directors	14,800	26,000	41,969	74,859	109,700	132,000	142,685	156,374
Total NHS staff - FTs	2,486,400	4,101,900	6,068,965	9,595,021	13,629,600	16,934,900	18,519,660	22,021,432
Total NHS staff - all trusts	25,665,773	27,588,830	28,664,013	29,975,525	32,041,487	34,284,053	36,510,927	40,937,972
PCTs								
Total Senior Managers & Managers	780,970	863,892	825,938	808,074	891,739	1,041,803	979,417	672,623
Total Medical Staff (including locums)	340,367	359,456	386,793	379,779	447,445	449,359	399,512	142,943
Total Dental Staff (including locums)	76,315	81,672	79,642	93,216	97,205	104,662	79,489	15,334
Total Nursing Midwifery & Health Visiting Staff	2,389,454	2,652,729	2,714,685	2,720,984	2,808,387	2,961,335	2,503,670	354,562
Total Scientific, Therapeutic & Technical Staff	815,104	929,085	988,349	1,005,470	1,092,789	1,187,341	1,036,967	183,177
Administrative and clerical	772,569	910,954	1,004,588	1,079,280	1,264,287	1,458,809	1,384,532	719,739
Healthcare Assistants and other Support Staff	168,873	169,235	172,229	195,796	273,172	345,243	300,808	58,402
Maintenance and works staff	19,145	22,261	24,076	21,859	23,607	23,250	22,052	11,290
Ambulance staff	95	204	5,103	5,008	3,673	3,272	3,816	4,083
Other employees	31,311	49,201	49,731	84,346	71,614	63,784	56,676	7,615
Chairman & Non-Executive Directors	88,068	77,949	52,026	42,281	22,660	19,716	17,077	13,472
Total NHS staff - PCTs	5,482,270	6,116,638	6,303,160	6,418,594	6,996,578	7,658,575	6,784,016	2,183,240
Total NHS staff - SHAs	186,209	221,279	210,336	145,865	175,388	202,473	218,896	239,409
Total staff - NHS	31,334,252	33,926,746	35,177,509	36,539,984	39,213,454	42,145,100	43,513,839	43,360,622

Table 26: Current expenditure on Agency staff (£000)

	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
Hospital and ambulance trusts								
Medical	299,054	228,969	148,384	155,532	218,586	294,025	339,138	296,868
Dental	1,044	3,315	464	155	376	307	240	824
Nursing, midwifery and health visiting	320,967	246,376	134,055	147,889	200,820	174,988	209,693	205,743
Scientific, Therapeutic & Technical Staff	158,854	126,380	86,494	66,054	92,668	113,277	101,122	88,618
Administrative & Clerical	114,061	113,867	98,565	131,360	183,103	166,615	134,357	126,843
Healthcare Assistants & Other Support Staff	44,408	46,890	35,313	35,010	36,440	39,657	39,947	46,207
Maintenance & Works Staff	7,959	4,515	4,008	6,925	7,047	7,013	5,399	4,925
Ambulance Staff	198	696	97	1,008	416	3,249	2,889	1,860
Other Employees	37,739	45,306	36,632	40,355	32,204	29,214	24,558	20,421
Total agency - hospital & ambulance trusts	984,283	816,314	544,012	584,288	771,661	828,345	857,341	792,309
Foundation Trusts								
Total agency	89,400	132,500	175,419	324,743	622,100	764,100	854,683	917,608
Total agency - all trusts	1,073,683	948,814	719,431	909,031	1,393,761	1,592,445	1,712,024	1,709,917
PCTs								
Medical	29,963	27,989	28,571	28,186	39,587	54,789	47,168	8,509
Dental	1,121	1,703	1,417	1,537	2,556	3,209	1,716	351
Nursing, midwifery and health visiting	81,324	74,856	59,009	61,113	80,990	91,847	70,358	14,722
Scientific, Therapeutic & Technical Staff	57,490	58,500	39,831	41,938	52,931	72,082	47,191	9,674
Administrative & Clerical	61,626	72,329	73,640	115,109	239,182	292,571	179,392	96,780
Healthcare Assistants & Other Support Staff	11,141	10,339	10,486	7,672	12,376	14,997	15,517	2,480
Maintenance & Works Staff	857	793	866	2,859	1,972	1,961	8,750	764
Ambulance Staff	4	1	0	2	-	0	21	124
Other Employees	36,579	26,924	28,120	24,218	52,781	40,311	21,273	11,670
Total agency - PCTs	280,105	273,434	241,940	282,634	482,375	571,766	391,383	145,074
Total agency - SHAs	203,494	237,688	223,873	162,855	19,316	31,084	24,482	18,002
Total agency - NHS	1,557,282	1,459,936	1,185,244	1,354,520	1,895,452	2,195,295	2,127,889	1,872,993

Table 27: Current expenditure on intermediate inputs (£000)

	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
NHS Hospitals, foundation trusts and ambulance trusts								
Drugs & gases	2,591,885	2,647,598	2,814,027	3,115,381	3,460,008	3,773,131	4,111,128	4,433,104
Clinical supplies & services	405,985	594,689	748,493	942,142	1,119,410	1,307,254	1,455,860	1,657,692
General supplies & services	743,426	853,397	911,504	1,045,835	1,119,750	1,177,681	1,226,148	1,340,135
Establishment	951,971	981,559	982,216	1,085,634	1,104,583	1,099,538	1,163,635	1,336,928
Energy & premises	799,962	1,031,786	1,161,463	1,279,173	1,506,901	1,289,767	1,436,318	1,807,316
External purchasing	609,215	669,508	738,923	916,352	962,768	950,531	1,061,324	1,295,429
Miscellaneous	888,577	1,435,572	1,612,571	1,747,727	1,852,820	2,243,732	2,506,806	3,070,984
Total intermediate costs - all trusts	6,991,023	8,214,109	8,969,197	10,132,245	11,126,240	11,841,634	12,961,219	14,941,588
PCTs								
Drugs & gases	56,869	113,846	139,378	170,870	187,408	200,988	186,145	112,300
Clinical supplies & services	67,404	86,998	73,611	95,094	120,947	124,955	129,315	59,740
General supplies & services	125,328	150,141	152,845	152,477	174,110	183,420	165,530	99,305
Establishment	426,848	444,423	424,533	480,041	559,159	584,065	501,123	236,873
Energy & premises	184,047	266,208	355,355	431,229	517,808	476,204	466,498	409,380
External purchasing	3,392,397	4,167,900	4,726,131	5,849,765	6,660,276	7,701,685	8,372,110	8,563,496
Miscellaneous	679,358	703,698	920,175	1,148,231	729,554	792,681	1,053,120	1,024,723
Total intermediate costs - PCTs	4,932,251	5,933,214	6,792,028	8,327,707	8,949,262	10,063,998	10,873,841	10,505,818
Total intermediate costs - SHAs	58,721	67,368	72,493	94,749	109,351	111,812	96,254	75,130
Total intermediate costs - NHS	11,981,995	14,214,691	15,833,718	18,554,701	20,184,853	22,017,444	23,931,314	25,522,535

Table 28: Current expenditure on capital inputs (£000)

	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12
NHS hospitals, foundation trusts and ambulance trusts								
Equipment								
Medical & Surgical Equipment - Purchase	1,111,881	1,362,224	1,339,694	1,355,021	1,245,422	1,167,041	1,197,825	1,280,420
Medical & Surgical Equipment - Maintenance	96,787	106,021	112,531	114,218	107,030	107,579	111,575	128,416
X-Ray Equipment - Purchase	26,298	27,600	29,187	33,498	29,704	24,939	22,819	19,702
X-Ray Equipment - Maintenance	57,223	55,030	56,133	51,721	47,581	42,277	42,858	41,116
Appliances	263,890	285,000	281,882	292,970	285,790	249,936	296,065	290,497
Laboratory Equipment - Purchase	270,876	288,360	282,818	268,995	257,484	252,223	253,170	260,896
Laboratory Equipment - Maintenance	25,023	27,197	29,163	27,917	22,215	23,367	20,895	22,743
Furniture, Office & Computer Equipment	152,182	141,995	134,995	165,375	130,867	110,643	105,856	119,436
Computer Hardware-Maintenance & Data Processing Contracts	153,909	153,539	144,839	135,976	122,961	118,483	126,216	139,535
IT services and supplies	222,471	348,042	525,340	819,274	1,040,250	1,289,967	1,470,957	1,683,631
IT operating lease rentals and Plant and Machinery	20,300	51,000	112,515	159,029	250,500	213,100	197,545	296,000
Premises								
Building and Engineering Equipment	88,141	85,151	86,569	95,776	79,577	75,322	66,904	67,220
Building & Engineering Contracts	186,380	197,368	210,435	243,097	196,779	122,817	138,915	173,024
IT premises - capital items	91,973	170,520	264,196	420,980	603,072	607,632	685,504	848,098
Business Rates	157,516	163,147	183,930	157,402	125,163	125,657	135,102	151,862
Total Depreciation	1,496,615	1,584,902	1,898,587	2,256,385	1,757,815	1,985,531	1,967,692	1,840,530
Total capital costs - all trusts	4,421,465	5,047,096	5,692,814	6,597,634	6,302,210	6,516,514	6,839,898	7,363,126
PCTs								
Equipment								
Medical & Surgical Equipment - Purchase	114,262	141,134	149,264	184,400	202,453	213,339	180,571	49,904
Medical & Surgical Equipment - Maintenance	9,179	10,449	13,611	15,587	14,085	16,785	15,630	4,463
X-Ray Equipment - Purchase	605	483	310	2,061	332	281	290	160
X-Ray Equipment - Maintenance	875	971	1,931	1,476	1,601	2,406	1,714	947
Appliances	76,628	92,845	93,524	119,113	127,138	117,031	95,473	25,331
Laboratory Equipment - Purchase	1,817	2,566	3,878	5,345	6,257	13,700	8,999	3,032
Laboratory Equipment - Maintenance	45	352	240	774	558	935	3,269	303
Furniture, Office & Computer Equipment	70,654	80,094	71,944	125,367	149,389	118,276	92,741	65,931
Computer Hardware-Maintenance & Data Processing Contracts	36,223	43,287	46,088	68,799	63,726	63,621	62,564	53,101
Premises								
Building and Engineering Equipment	29,255	24,040	26,888	48,240	48,939	49,961	38,229	30,237
Building & Engineering Contracts	39,315	46,128	37,675	77,803	102,408	77,041	57,286	58,175
Business Rates	41,416	49,829	62,083	65,901	71,700	81,760	80,420	69,513
Total Depreciation & Impairment	255,030	286,343	352,475	459,975	320,981	344,647	348,578	531,507
Total capital costs - PCTs	675,303	778,521	859,911	1,174,841	1,109,566	1,099,782	1,171,813	892,604
Total capital costs - SHAs	18,746	14,048	15,638	12,117	14,255	19,094	13,092	9,349
Total capital costs - NHS	5,115,514	5,839,664	6,568,363	7,784,592	7,426,031	7,635,390	8,025,361	8,265,079